

# Condensing Units

Air-Cooled — Remote

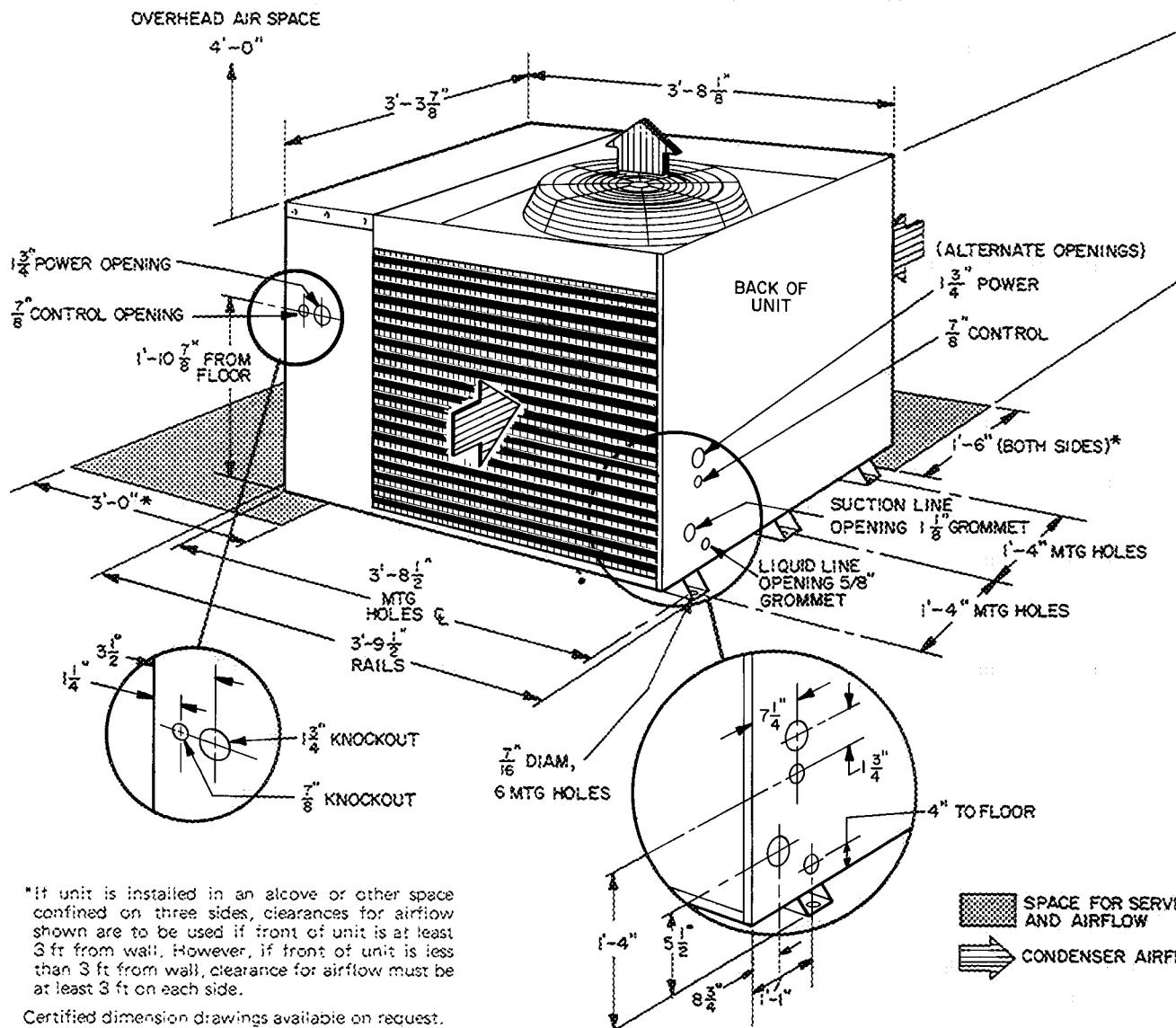
## UNIT PREPARATION

**Rigging and Unpacking Unit** — Do not sling unskidded unit. Use spreader bars to prevent slings from damaging unit cabinet. Keep unit upright. Remove shipping skid at final location. Check nameplate to be sure unit matches power supply. Examine unit for shipping damage. File claim with transportation agency if required.

**Location** — Install condensing unit outdoors only. Do not situate unit so as to restrict service area or cause excessive air recirculation. Observe minimum

air space requirements for confined area installations as indicated in Fig. 1.

Mount unit on a concrete slab, 4 ft x 4 ft x 4 in. or wood (or I-beam) frame with members perpendicular to unit rails to support unit weight and size. Secure unit with 7/16-in. OD lag bolts or screws. Apply mastic or roof cement where unit rails rest on slab or where frame rests on roof surface. Do not plug unit base pan drain holes. Provide a 12-in. gravel apron on both sides of unit to prevent foliage from obstructing condenser air flow.



\*If unit is installed in an alcove or other space confined on three sides, clearances for airflow shown are to be used if front of unit is at least 3 ft from wall. However, if front of unit is less than 3 ft from wall, clearance for airflow must be at least 3 ft on each side.

Certified dimension drawings available on request.

Fig. 1 — Dimensions

Table 1 — Physical Data (60-Hz)

| UNIT 38BA                   | 008                    | 009  |
|-----------------------------|------------------------|------|
| OPERATING WT (lb)           | 565                    | 595  |
| REFRIGERANT 22              |                        |      |
| Factory Holding Charge (lb) | 2.00                   | 2.25 |
| Operating Charge (lb)       | 14.5                   | 16   |
| Oil Charge (pints)          | 7.0                    | 10.0 |
| CONDENSER FAN               | Direct Drive Propeller |      |
| No. - Diam (in.)            | 1 - 22                 |      |
| Motor, Hp ... Rpm           | 1/2 1075               |      |
| PRESSURESTAT                | Settings in Psig       |      |
| High Cutout                 | 428 ± 4                |      |
| Cut-in                      | 328 ± 19               |      |
| Differential                | 100 ± 15               |      |
| Low Cutout                  | 27 ± 4                 |      |
| Cut-in                      | 60 ± 15, -0            |      |

Although cabinet is weatherproof, do not mount unit under roof overhangs or other sources of excessive water runoff. Consult local codes.

**Panel Removal** — After unit is in place remove compressor access panel by removing the 3 screws at bottom of panel. Top fan grille is also fastened with screws and may be removed. Two refrigerant line openings are provided in back panel of unit (Fig. 1).

**Compressor Mounting** — Loosen compressor hold-down bolts until snubber washer is snug but not tight. Bolts are self-locking and will retain their adjustment.

## REFRIGERANT PIPING

**Line Size** — Unit designed for maximum vertical liquid lift of 35 ft. Refer to Part 3 of Carrier System Design Manual for design details and Table 2 for recommended line sizes. Unit is shipped with only a holding charge as indicated in Table 1.

Table 2 — Refrigerant Line Sizes (in. OD)

| UNIT 38BA                     | 008          | 009          |
|-------------------------------|--------------|--------------|
| 30-foot length Suction Liquid | 1 1/8<br>1/2 | 1 1/8<br>5/8 |
| 60-foot length Suction Liquid | 1 1/8<br>5/8 | 1 1/8<br>5/8 |
| 90-foot length Suction Liquid | 1 1/8<br>5/8 | 1 3/8<br>5/8 |

**Line Isolation** — Do not attach refrigerant lines directly to building structure, ductwork or to each other. Use isolation-type refrigerant line hangers to prevent vibration transmission (Fig. 2).

An alternate method is to route unsupported but fully insulated lines wherever possible.

**Insulation** — Cover entire suction line with 1-in. refrigerant pipe insulation. Protect all sections of insulated line exposed to the elements with an asphalt waterproofing compound.

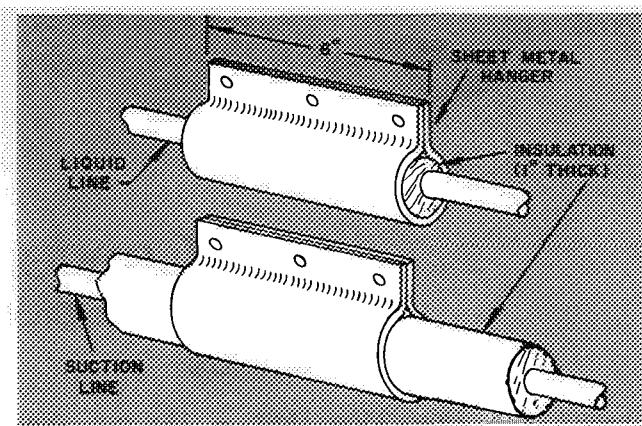


Fig. 2 — Refrigerant Line Hangers

**Sight Glass and Filter-Drier** — Every unit should have a filter-drier and sight glass installed. Because of the variety of preference of filter-driers, neither filter-drier nor liquid-moisture indicator is factory supplied. Select the filter-drier for maximum unit capacity and minimum pressure drop. Figure 4 shows recommended locations of field-supplied filter-drier(s) and sight glass. Complete the refrigerant piping from the evaporator to the condenser before opening the liquid and suction lines at the condensing unit.

Do not use pumpdown control with these units.

## Piping Procedure

1. Frontseat condensing unit liquid and suction line shutoff valves. (Unit is shipped with valves in midseat position.)
2. Remove run-around loop (Fig. 3) by loosening flare nut connection at liquid line shutoff valve flare connection (A) to relieve run-around loop pressure. Unsweat other end (B) of run-around loop at suction line shutoff valve tube.

**CAUTION:** Do not overheat nearby components.

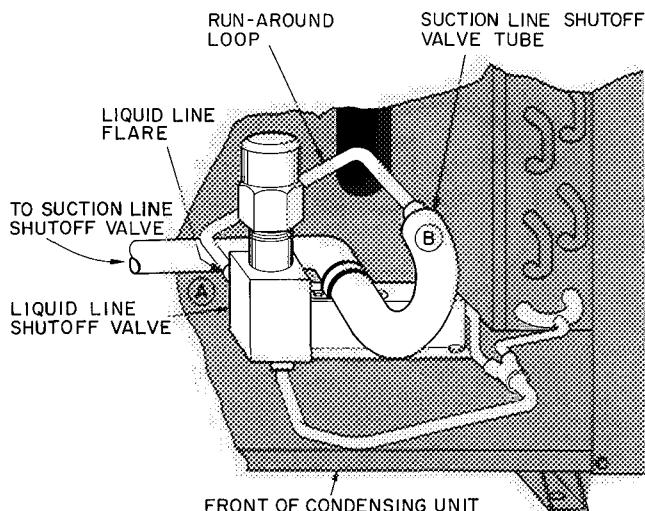


Fig. 3 — Condensing Unit Piping Connections

3. Connect suction line to condensing unit suction line shutoff valve tube (B on Fig. 3) and evaporator suction outlet.
4. Connect liquid line to condensing unit liquid line shutoff valve. Make this flare connection tight.
5. Connect expansion valve outlet to evaporator coil distributor inlet flare. *Do not tighten this flare at this time*
6. Connect field-supplied filter-drier and sight glass in the liquid line ahead of the thermostat expansion valve. Sight glass should be located between the filter-drier and the thermostatic expansion valve as shown in Fig. 4. Tighten expansion valve inlet connection.
7. Momentarily crack open suction line shutoff valve to purge suction line and evaporator coil at loose flare connection on evaporator coil distributor. Repeat at liquid line shutoff valve to purge liquid line, filter-drier, and expansion valve.
8. Tighten distributor flare nut connection.
9. Crack expansion valve external equalizer flare connection to purge external equalizer line.
10. Open all refrigerant system valves.
11. Allow system pressure to equalize, then check all joints for leaks.

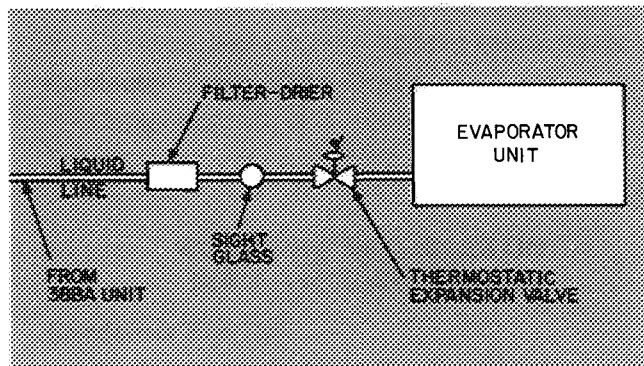
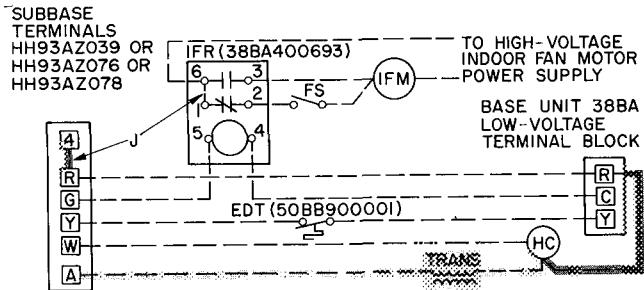


Fig. 4 – Recommended Filter-Drier and Sight Glass Locations (Field Installed)

**Refrigerant Charge** — Units are shipped with a holding charge of 2.0 lbs for 008 sizes and 2.25 lbs for 009 sizes. If it is necessary to evacuate and recharge system or when system requires additional charge, refer to charging information in Start-Up section of this book.

**Wiring** — Unit is factory wired for voltage shown on nameplate and in Table 3. Provide an adequate fused disconnect switch *within sight of unit and readily accessible* but out of reach of children. Provision for locking switch open (off) is advisable to prevent power from being turned on while unit is being serviced. Disconnect switch, fuses, and field wiring must comply with National Electrical Code and local requirements. Route field power and control wiring thru cabinet openings (Fig. 1).

Install and connect all accessories and field-supplied components according to manufacturer's instructions and Fig. 5.



■ Wiring with 24-volt transformer in condensing unit only.  
Install jumper between **4** and **R** (Jumper supplied on subbase HH93AZ076 and HH93OZ078 )

■ Wiring with 24-volt transformer in furnace and condensing unit

**EDT** — Evaporator Defrost Thermostat (for winter start)

**FS** — Fan Switch (heating device)

**HC** — Heater Control

**IFM** — Indoor Fan Motor

**IFR** — Indoor Fan Relay

**J** — Jumper

**Trans** — Transformer

#### NOTES

- 1 Connect fan switch to low-speed fan terminal when two-speed fan is used
- 2 Connect a SPST field-supplied relay in series with any heating control which is not equipped with a transformer but uses 115 volts or pilot generation

Fig. 5 – Control Circuit Field Wiring

→ Table 3 — Electrical Data (3-Ph, 60-Hz)

| UNIT<br>38BA | NAME-<br>PLATE | VOLTS     |     | MCA  | MAX<br>FUSE<br>AMPS <sup>†</sup> | COMPR |      | FAN  |
|--------------|----------------|-----------|-----|------|----------------------------------|-------|------|------|
|              |                | Supplied* | Min |      |                                  | LRA   | RLA  | FLA  |
| 540          | 208-230        | 187       | 253 | 42.7 | 50                               | 137   | 31.3 | 3.6  |
| 008 630      | 460            | 414       | 528 | 19.4 | 30                               | 62    | 14.1 | 1.8  |
| 130          | 575            | 518       | 660 | 16.4 | 25                               | 50    | 10.2 | 3.6‡ |
| 550          | 208-230        | 187       | 253 | 53.1 | 70                               | 170   | 39.6 | 3.6  |
| 009 630      | 460            | 414       | 528 | 24.1 | 40                               | 77    | 17.8 | 1.8  |
| 130          | 575            | 518       | 660 | 20.9 | 40                               | 62    | 13.8 | 3.6‡ |

**FLA** — Full Load Amps (fan motor)

**LRA** — Locked Rotor Amps

**MCA** — Minimum Circuit Amps Complies with National Electrical Code, Section 430-24

**RLA** — Rated Load Amps (compressor)

\*Units are suitable for use on electrical systems where voltage supplied to the unit terminals is not below or above the limits shown

†Maximum allowable size; dual element

‡230-volt motor Unit has 575 v to 230 v transformer

#### NOTES

- 1 Compressor and fan motors have inherent thermal protection
- 2 Wire sizes and length based on ratings for copper at 60 C
- 3 Maximum allowable voltage unbalance between phases is 2%

## START-UP

**To Charge System** — Before starting unit, purge lines and refer to Standard Service Techniques, Chapter 1, Refrigerants. Unit operating charge as indicated in Table 1 is sufficient to maintain a clear sight glass on systems up to 25 ft of refrigerant tubing.

For clear sight glass operation, restrict condenser airflow to maintain  $330 \pm 10$  psig (measured at liquid line valve) and add charge until sight glass is clear.

### Cooling

1. Refer to Start-Up and Service Instructions provided with indoor cooling coil unit.
2. Turn on main power to cooling system. Allow crankcase heater to be on for 12 hours before start-up.
3. Set room thermostat to desired temperature.
4. Set remote control center switches to COOL and FAN (or AUTO.) as desired.

### Heating (if provided)

1. Refer to heating system equipment instructions.
2. Turn on main power to heating system.
3. Set room thermostat to desired temperature.
4. Set remote control center switches to HEAT and AUTO.

## SERVICE

**Crankcase Heater** is energized whenever unit power is on but automatically shuts off when compressor starts. Energize crankcase heater for 12 hours before starting compressor after a long shutdown.

**Condenser Fan Adjustment** — Remove air outlet grille. Loosen fan hub setscrews and adjust fan to correct position (Fig. 6). Tighten setscrews and replace air grille. Refer to Motormaster® instructions for fan-speed control as required.

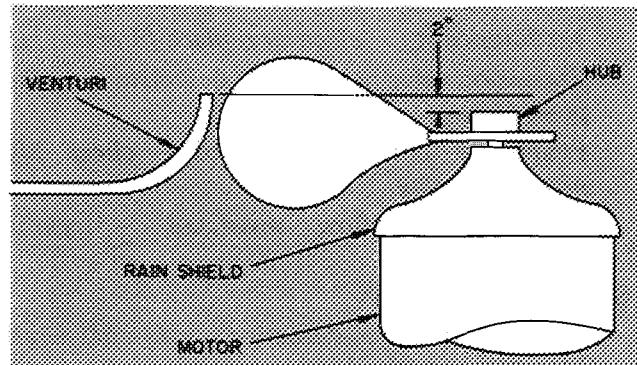


Fig. 6 — Condenser Fan Adjustment

**Refrigerant Charge** — Units are shipped with a holding charge of 2.0 lbs for 008 sizes and 2.25 lbs for 009 sizes. If it is necessary to evacuate and recharge system or when system requires additional charge, refer to charging information in Start-Up section of this book.

### Lubrication

CONDENSER FAN MOTOR BEARINGS are factory sealed and require no lubrication.

COMPRESSOR has its own oil supply (Table 1). Refer to Standard Service Techniques Manual, Chapter 1, Refrigerants, if oil replenishment is necessary.

**Oil Charge (Table 1)** — Allow unit to run for about 20 minutes. Stop unit and check compressor oil level. Add oil only if necessary to bring oil into view in sight glass. *Use only Carrier-approved compressor oil* Approved oils are:

Sun Oil Company ..... Suniso 3GS  
Texaco, Inc. ..... Capella BI  
E.I. DuPont Company ..... DuPont Synthetic  
Refrigeration Oil (150 SSU only)

*Do not reuse drained oil or use any oil that has been exposed to atmosphere.* Procedures for adding or removing oil are given in Carrier Standard Service Techniques Manual, Chapter 1, Refrigerants.

If oil is added, run unit for additional 10 minutes. Stop unit and check oil level. If level is still low, add oil *only after* determining that piping system is designed for proper oil return and that the system is not leaking oil.

**Compressor Control Circuit** and protective devices are factory set (Table 1) and operate on line voltage except the low-pressure cutout switch which operates in the low-voltage circuit. Refer to unit label diagram or Wiring Diagrams booklet.

**Time Guard® Circuit** causes a delay of 15 seconds after thermostat closes before compressor will start. On compressor shutdown, timer recycles for 4 minutes and 45 seconds. During this time compressor will not restart. However, it may be manually started by pushing momentary switch. Wait 3 minutes between manual restarts.

## TROUBLESHOOTING GUIDE

### COMPRESSOR WILL NOT RUN

#### Contactor Open

Power off — *restore power*

Fuses blown — *replace with fuses of correct capacity*

Transformer dead — *replace transformer if primary windings are receiving power*

Thermostat circuit open — *set thermostat correctly. Clean or replace thermostat*

Control relay defective — *replace relay*

Holding relay open — *check safety switches*

Overload open — *shut down unit. Investigate reason for high motor winding temperatures*

Low-pressure switch open — *check refrigerant charge or obstruction in airflow*

High-pressure switch open — *remove condenser airflow obstruction. Check for overcharge*

Connections loose — *tighten all connections*

Compressor stuck — *replace compressor*

#### Contactor Closed

Single phasing — *replace blown fuse*

Compressor, contactor leads loose — *tighten*

Motor windings open — *replace compressor*

Overload leads loose — *tighten connections*

#### Contactor Closed Then Opens

Compressor stuck — *replace compressor*

### COMPRESSOR CYCLES ON HIGH-PRESSURE SWITCH

#### Condenser Fan On

Airflow restricted — *remove dirt, leaves, etc from condenser*

Air recirculating — *clear airflow area or add baffles*

Refrigerant overcharge — *purge until sight glass flashes; recharge*

Noncondensables in system — *evacuate system and recharge. Also check switch cutout setting*

#### Condenser Fan Off

Fan slipping on shaft — *tighten or replace fan setscrews*

Electrical connections loose — *tighten*

Bearings stuck — *replace bearings or motor*

Overload open — *check overload. Check for fan obstruction*

Fan motor burned out — *replace motor*

### COMPRESSOR CYCLES ON LOW-PRESSURE SWITCH

#### Evaporator Fan Running

Filter-drier plugged — *replace filter-drier*

Expansion valve power head defective — *replace power head*

Low refrigerant charge — *add charge as needed. Also check switch cutout setting*

#### Airflow Restricted

Coil iced up — *check refrigerant charge*

Air filters dirty — *clean or replace filters*

Ductwork obstructed — *clean ductwork*

Dampers closed — *check damper operation*

#### Evaporator Fan Stopped

Electrical connections loose — *tighten all loose connections*

Overload open — *check power supply to unit*

Fan motor burned out — *replace fan motor. Check for obstructed fan blades*

Fan belt broken or slipping — *replace or tighten*

Fan relay defective — *replace relay*

### COMPRESSOR RUNS BUT COOLING INSUFFICIENT

#### Suction Pressure Low

Refrigerant charge low — *add refrigerant*

Low-pressure switch setting too high — *adjust to correct setting*

Head pressure low — *check refrigerant charge. Check condenser air fan thermostat settings*

Air filters dirty — *clean or replace filters*

Expansion valve power head defective — *replace power head*

Evaporator coil partially iced — *check low-pressure setting*

Evaporator airflow restricted — *remove obstruction*

#### Suction Pressure High

Compressor valves defective — *see 06D service literature*

Heat load excessive — *check for open doors or windows*

**For replacement items use Carrier Specified Parts.**

**Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.**

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